

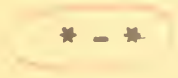
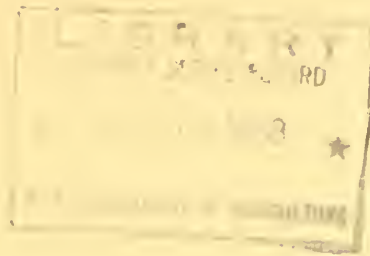
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FEDERAL-GRANT RESEARCH  
at the  
STATE AGRICULTURAL  
EXPERIMENT STATIONS

Projects on  
FOOD SCIENCE AND TECHNOLOGY  
Part 9, Section b  
Food Engineering, Processing,  
Product and Process Development,  
Utilization and Waste Disposal

Agricultural Research Service  
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled March 1958 by

the State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

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## INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.





## FOOD ENGINEERING

### Machinery and Equipment

- Ga.            Development of Production Practices and Equipment for Mechanical Harvesting and Shelling of Southern Peas (Vigna Sinensis).  
To (1) evaluate most promising varieties for mechanical harvesting and shelling, using equipment available; (2) devise cultural methods and design and construct necessary equipment for efficient harvesting and shelling of southern peas.  
Hort., Agr. Engin., Food Proc. 94
- Ga.            A Study of Dairy Products Processing Plants Equipment and Facilities. To (1) study present facilities of dairy processing plants in Southeast and learn methods to improve facilities; (2) develop standards of design, construction and operation of plants and equipment for dairy products processing that are economically adapted to an expanded dairy industry; (3) study use of specialized equipment to increase dairy plant operational efficiency; and (4) make field survey of typical specialized and diversified dairy plants to secure data on advantages and disadvantages of different types of construction, arrangements of equipment and plant locations, and their effect on operating efficiency and production.  
Agr. Engin, 307 Coop. AMS
- Ga.            Poultry Processing Plants, Equipment, and Facilities. To (1) determine comparative efficiency of selected poultry plants varying in size and sequence of operations; (2) develop plant layout principles and improved materials, handling and work methods; and (3) design processing plants with equipment and facilities for conducting all operations incident to receiving processing and final disposition of finished product and supplies.  
Agr. Engin., Poultry Husb. 308 Coop. AMS
- Ga.            Agricultural Processing Plants, Facilities and Equipment.  
To (1) provide basic engineering data on design factors for refrigerated meat rooms; (2) design, construct and test gas fired retort; and (3) develop plans and specifications for semi-commercial processing plant and equipment for peas and lima beans.  
Agr. Engin. 309 Coop. AMS
- Mass.        Refrigerated Fruit Storage. To study operation of refrigerated and modified atmosphere apple and cranberry storages in Massachusetts so that design conditions based on fundamentals can be established for these types of refrigerated fruit storages in Massachusetts.  
Agr. Engin. 52

S. C.      Developing a High Speed Mechanical Peach Pitter for South-eastern Freestone Peaches. To develop a high speed, or large volume freestone peach pitter which would be low in cost, efficient in use, and simple to operate, for use by commercial canners, freezers, and other peach processors.  
Hort. 68

Tenn.      Food Processing Machinery Development. To develop (1) jumbo sweet potato cutter and sizer; and (2) automatic okra butt end trimmer.  
Agr. Engin. 26

Engineering Applications and Functions

Ala.      Development and Refinement of Processes for Improving the Market Quality of Selected Products from Horticultural Crops. To (1) develop and refine processes for improving market qualities of selected products from horticultural crops and adapt these processes to commercial use; and (2) determine indicated yields and approximate costs of finished products from different commercial grades of fresh material when processed by different methods.  
Hort. 549

Ariz.      The Effect of Packaging on the Sale of Eggs. To (1) study sales promotion as affected by carton types: standard carton, standard carton with 40% of cover replaced by plastic, transparent plastic container; (2) determine if consumer will pay a premium for eggs offered in plastic cartons; and (3) study consumer acceptance as affected by yolk color--light, medium, dark.  
Poultry Sci. 421

Calif.      Economic Factors in the Selection of Products and Markets and in Plant Location and Organization in the Freezing of California Fruits and Vegetables. To (1) study physical and economic relations in the assembly of product and operation of freezing plants for western fruits and vegetables; (2) study supply, demand, and price relations for frozen fruits and vegetables; (3) determine competitive position of California frozen fruit and vegetable industry in the national market; and (4) project efficient pattern of growth of the industry.  
Agr. Econ. 1571 (WM-17) Coop. AMS (See also Part 14, Section b)

Calif.      Costs and Efficiency in the Marketing of Selected California Fruits and Vegetables. To (1) determine basic physical and economic relationships involved in the operation of deciduous fruit packing houses; (2) indicate how changes in work methods and type of equipment and in-plant organization will affect efficiency and costs; and (3) on the basis of above, develop practical means for improving efficiency in operation of California deciduous fruit packing houses.  
Agr. Econ. 1574 Coop. AMS

Calif. Engineering, Qualitative and Economic Studies of the Packaging, Handling and Shipping of Deciduous Fruit. To (1) develop new containers, suitable equipment and improved techniques for packaging and handling deciduous fruit, and determine how these developments influence plant operations, packing and shipping costs and quality of product at consumer level; (2) determine basic laws underlying volume fill in containers for various shapes and sizes; (3) work with container manufacturers in developing suitable containers and standardizing packages as soon as basic principles are established; (4) develop improved equipment for more accurate sizing of fruit if needed; (5) if sorting on basis of color becomes necessary, apply known principle of electronic color sorting; (6) study car loading patterns to determine best arrangements for full or partial shipments on containers of various types; (7) determine best methods of pre-cooling fruit packed, or to be packed, in various type containers; (8) keep continuous record of condition and quality of fruit from time it leaves tree until reaching final consumer; (9) study influence of maturity on handling and packaging; and (10) make economic studies of pilot packing lines to compare with studies of conventional methods.

Agr. Engin., Pomology, Agr. Econ. 1579

Calif. Physiological and Pathological Problems Associated with the Consumer Packaging of Table Grapes. To determine (1) rates and amount of SO<sub>2</sub> diffusing into consumer package during fumigation; (2) resistance of different types of plastic films to corrosion from SO<sub>2</sub> under different moisture conditions; (3) bleaching effect of SO<sub>2</sub> on wet printed package material; (4) size and shape of consumer packages most suitable for clusters of different table grape varieties; (5) adaptation of cluster size and shape to standard sized packages by thinning before harvest; (6) relative stem brownness and dryness of consumer packaged versus standard shipping container packed grapes; (7) precooling rates of fruit in consumer packages versus that in standard shipping containers; (8) relative amounts of shatter; and (9) relative amounts of decay.

Viticulture 1640

Fla. An Analysis of the Efficiency of the Elemental Functions of Packing and Handling Florida Citrus from the Tree through the Packing House. To measure efficiency of elemental functions of packing house operations of Florida fresh citrus fruit.

Agr. Econ. 626 (SM-4) Coop. AMS (See also Part 14, Section b)

Ind. Increasing the Efficiency in Meat Packing Plants in Indiana. To (1) develop procedure for learning optimum combination of products to process in packing plants; (2) determine methods for reducing costs of operating packing plants in State through improved use of space, labor and equipment; and (3) test recommendations synthesized from objectives 1 and 2.

Agr. Econ. ES-482

- Ind.      Control of Incompatibility, through the Use of Packaging and other Means, in the Refrigerated Storage of Agricultural Commodities. To (1) determine optimum storage requirements of specific commodities by studying product behavior in various environments where requirements have not been established; (2) evaluate efficiency of various packaging materials in regard to providing proper environment for storage of each commodity and to protect it from flavor and odor contamination; (3) evaluate methods of detecting, identifying, and measuring odor levels in atmosphere of storage room or package; and (4) evaluate effectiveness of physical and chemical adsorbents, absorbents, or destroyers of detrimental odors occurring in storage room.  
Hort., Biochem., Agr. Engin., Dairy Husb. 935
- La.      Methods of Cleaning Market Eggs. To (1) compare effects of agitator type washer, rotating brush type, and dry-cleaning upon (a) breakage of eggs during cleaning process, (b) interior quality of eggs due to handling, removal of cuticle, and subsequent loss of moisture, and (c) keeping quality of eggs up to 8 months in storage; and (2) determine effect of oiling and thermo-stabilizing on keeping quality of washed stored eggs.  
Agr. Econ., Poultry Indus. 871
- Md.      Economies of Scale and Factors Affecting Variations in Costs of Processing Fruits and Vegetables in Maryland. To determine (1) unit cost of processing food products in single and multiple product plants; (2) extent of variation in unit cost by products and at varying levels of operation as percentages of plant capacity; and (3) variation in unit product cost among plants of different sizes at similar levels of capacity operation.  
Agr. Econ., Hort., A-34 (NEM-16) Coop. AMS (See also Part 14, Sec. b)
- Md.      Bulk Packaging and Shipping of Raw Vegetables. To (1) develop improved field handling methods for vegetables and measure their effect on quality; and (2) reduce waste vegetable matter and containers to a minimum while retaining quality.  
Hort., Agr. Engin. Q-58-q (NEM-18) Coop AMS (See also Part 22, Sec. a)
- Mass.      The Role of Cooling Methods, Chemical Washer, and Pre-Packaging in Improving the Quality of Fresh Fruits and Vegetables. To improve present marketing practices and quality of New England fresh fruits and vegetables by (a) application of technological advances in cooling methods, (b) chemical washes, (c) pre-packaging: studying blueberries, cranberries, raspberries, strawberries, peaches, grapes, asparagus, green beans, peas, corn, onions, celery, potatoes, lettuce and spinach.  
Food Tech. 68

- Mass.      Pre-peeled Potatoes for Hotels and Restaurants. To (1) continue study of technological problems in reducing air in package about treated, pre-peeled potatoes; (2) determine if chemical agents other than those containing SO<sub>2</sub> could be used; (3) study problems of formulating and appraisal of various dipping treatments, types of packaging, and storage life of pre-peeled product before and after opening package.  
Food Tech. 70
- Mass.      The Study of Various Practices Used in Harvesting, Handling, and Marketing Certain Native Vegetables as they Relate to Post Harvest Length of Life, Quality and Consumer Acceptance. To (1) develop more efficient methods of maintaining peak harvest quality; and (2) reduce spoilage during handling and marketing of locally grown vegetables.  
Hort. 90
- Minn.      Economic Analysis of Milk Drying Plants. To ascertain how milk drying plants which were established or expanded to meet war needs will adjust their operations to peace-time markets, to delineate problems faced by such enterprises, and to seek solutions for them.  
Agr. Econ. 1118
- Minn.      Studies on Harvesting, Handling, Storage and Marketing on Table Stock Potatoes. 1. Studies on the Relation of Harvesting and Handling Operations and Storage Conditions to the Market and Culinary Quality of Potatoes. To improve the market and culinary quality of potatoes grown in the Red River Valley.  
Hort., Agr. Engin., Plant Path. 2118, -1 Coop. USDA
- Nebr.      Packaging Materials for Frozen Meat Storage. To determine (1) relationship between water-vapor permeability at 0° F. of packaging materials for frozen meat and rate of shrinkage due to moisture loss in stored product; (2) cause of differences in widely divergent weight losses through same packaging material for different meats; and (3) economic relationships between different types of meat packaging materials.  
Agr. Engin., Animal Husb. 494
- Nebr.      Economic Aspects of the Commercial Egg-breaking and Drying Industry of Nebraska. To (1) examine impact of technological and institutional changes including legal institutions in production and use of egg products on aggregate position of liquid, frozen, and dried egg industry; (2) analyze the interrelation between prices of shell eggs, frozen and dried egg products; (3) determine methods and costs of procuring and processing various egg products by commercial egg breakers and dryers; and (4) determine significance of physical characteristics of eggs as factors influencing processing costs, product characteristics and value, farm egg prices and buying basis.  
Agr. Econ. 582 (NCM-14) Coop. AMS (See also Part 14, Section e)

- N. J.            Development of Improved Handling and Packaging Practices for Selected Vegetables and Analysis of Their Impact on Costs and Returns. To (1) study feasibility and economic effects of prepackaging selected vegetables in consumer size packages at farm or shipping point; (2) test feasibility of moving selected vegetables to chain warehouses in bulk as palletized containers for prepackaging at this point.  
Agr. Econ., Food Tech. 29 (NEM-18) (See also Part 14, Section b)
- N. C.            Peanut Curing Studies. To (1) correlate response of peanuts to their environment during curing process; (2) use formulations from above objective as functional design specifications in development of a practical curing system.  
Agr. Engin. H-12
- Oreg.            Physiological Problems Relating to the Maturation and Storage of Fruits. 4. Pear Packaging Problems. To obtain information relative to use of new packaging materials for pears, principally (1) effect of package on fruit metabolism, longevity and quality in storage; (2) requirements and tolerances of specific near varieties with reference to atmospheric conditions within packages; and (3) adaptability of packages to commercial storage conditions.  
Hort. 47-4
- Oreg.            Physiological Problems Relating to Pre-packaging of Pears. To (1) develop pre-packaging methods for pears with special reference to: prevention of friction injury and skin discoloration, control of scald without use of paper wraps; (2) improve market quality and consumer acceptability by pre-packaging with special reference to: improvement in color development during ripening, increase in shelf life, reduction in damage goods rate.  
Hort. ES-515
- Pa.              Effects of Alternative Ways of Packaging Foods on Returns to Producers and Marketing Agencies. To (1) measure the costs of marketing associated with alternative packages; (2) appraise the effect on demand of present and prospective ways of packaging food; and (3) appraise effects on producer returns of alternative ways of packaging food products.  
Agr. Econ. and Rural Sociol. 1306-A
- R. I.            Factors Determining Costs of Alternative Techniques of Processing and Distributing Poultry Meat in Rhode Island. To (1) determine different marketing systems in State and compare costs; (2) develop systems of reducing cost of given marketing services.  
Agr. Econ., Poultry Husb. M-112 (NEM-21) Coop. AMS  
(See also Part 14, Section e)

- S. C.      Economic Problems in Processing Agricultural Products.  
To (1) determine for specific agricultural products the adequacy of existing processing facilities in terms of size, location, equipment, methods of operation, services, etc.; (2) evaluate selected types of processing plants in terms of their effects on area of supply, stability of demand for particular products, etc.; and (3) measure plant efficiency in terms of input-output relationships.  
Agr. Econ., Rural Sociol. 75
- Tex.      Increasing the Efficiency of Livestock Slaughter Plants in Texas. To (1) improve efficiency of work methods and equipment used in slaughtering; (2) develop improved layouts and design for livestock slaughter plant facilities; and (3) determine proper location and size of slaughter plants.  
Agr. Econ. and Sociol., Animal Husb. 1042 Coop. AMS
- Wash.      Economic Efficiency in Freezing Washington's Principal Fruit and Vegetable Crops. To (1) describe frozen food industry of state with emphasis on major crops frozen; (2) determine physical input-output relationships in raw material assembling and processing; and (3) determine comparative economic efficiency of different methods, organizations, and scale of operations used in assembling and freezing.  
Agr. Econ. 1300 (WM-17) Coop. AMS (See also Part 14, Section b)
- W. Va.      Economics of Packaging Selected Foods. Determine costs and values of certain alternative methods of packaging selected food products; (2) relate packaging to methods and itemized costs of handling and to market structure, giving special emphasis to directness of marketing; and (3) determine effects of types of packaging on retail sales volume, for individual firms by type of firm and for the industry.  
Agr. Econ. and Rural Sociol. 98

## FOOD PROCESSING

### General

- Colo.      Properties and Processing of Colorado Fruits and Vegetables.  
To study composition, nutritive values and related chemical, physical and organoleptic properties, and the modifications of these characteristics arising from variations in the sample.  
Home Econ. 90 Coop. ARS, Dept. of the Army--QMC

- Ga.            An Evaluation of Newly Introduced Selections and Varieties of Peaches. To (1) evaluate newly introduced selections and varieties of peaches in order to keep peach growers informed as to their commercial possibilities; (2) obtain information on date of bloom, ripening date, size and color of fruit, yield of fruit, shipping and handling quality, susceptibility to brown rot, and processing qualities.  
Hort., Food Tech. 84
- Idaho        Variety Testing of Fruits and Vegetables. To (1) test varieties of fruits and vegetables for adaptability to Idaho; (2) test yielding ability under Idaho conditions; (3) observe and note quality of fruits and vegetables, making organoleptic tests and other suitable tests, and (4) continue selections from existing seedling populations of apples and cherries originated at this station.  
Hort. 219
- La.            A Study of By-products, Physical Changes and Grades that Affect the Market Quality of Sweet and Irish Potato Varieties and Seedlings. To work out (1) new uses for sweet and white potatoes with emphasis on U. S. No. 2 grade sweet potatoes; (2) new methods of processing of grades not acceptable by fresh market and to learn acceptability of varieties, style of handling and packaging, and physical changes taking place.  
Hort., Agr. Econ., Plant Path., Engin. 909
- Mass.        Increasing Marketability of Processed Fruit and Vegetable Products through Improvement in Quality. To determine (1) effect of aseptic canning and high temperature-short time processing on quality retention in baby foods; (2) thermal destruction of enzymes causing deterioration in fruit and vegetable products; (3) effectiveness of sorbic acid as a selective microbial inhibitor in fruit products and pickles; (4) causes and control of softening in salt stock pickles; (5) influence of handling methods on quality of pasteurized fresh pack pickles.  
Food Tech. 66
- Mass.        Processing and Utilizing McIntosh Apples and Cranberries. To (1) study nitrogenous constituents and thiamine content of McIntosh and other varieties in relation to efficient conversion of apple carbohydrate to ethanol in preparation of vinegar stock; (2) identify specific deficient constituents and to devise practical methods of correcting same; (3) study application of Hunter Colormeter to grade cranberries and cranberry products; (4) study influence of environmental conditions in various bogs on development of red pigment of fresh fruit; (5) study quinic acid content of fruit; and (6) determine unknown acids in cranberry by application of chromatography.  
Food Tech. 69



- Minn. Handling, Processing, Packaging, and Storing of Fruits, Vegetables, and Other Food Products. 1. Processing, Packaging, Freezing, and Storing of Fruits, Vegetables, and Other Foods for Preservation by Freezing. 2. Varietal Adaptability of Fruits and Vegetables for Processing. 3. Handling, Packaging, Transporting and Storing of Fresh Fruits and Vegetables. To (1) obtain information of value to commercial processors, owners of frozen food locker plants, and to home processors; (2) assist Horticulture Department in selecting new varieties of fruits and vegetables for naming and introduction; (3) study post-harvest handling, packaging, and storage of fresh fruits and vegetables, including seedling selections.  
Hort. 2103, -1, -2, -3
- N. Y. (State) The Relation of Varietal Differences and Cultural Practices in the Ripening of Concord-Type Grapes and Grape Products. To study chemical changes during ripening under various conditions and to determine if grape processing season can be lengthened by introducing earlier Concord type varieties into commerce.  
Food Sci. 3a
- N. C. The Processing of Certain Fruits and Vegetable Crops Now Chiefly Grown for Fresh Market Sale. To increase the financial return to growers for certain fruits and vegetables now grown principally for the fresh market by (a) establishing canning plants for canning peaches, small-sized Irish potatoes, and small and medium-sized sweet potatoes, (b) freezing apples for pie making (c) investigations of freezing methods and suitability of North Carolina grown fruit for this purpose, and (d) studies on the manufacture of Irish potato flour.  
Hort. HM-17
- N. Dak. Quality Investigations of Hard Red Spring Wheat Varieties. To insure development and release of new hard red spring wheat varieties of excellent quality in North Dakota, by determining milling and baking qualities and associated attributes of quality of varieties and hybrids from experimental plots at Fargo and branch stations.  
Agron., Cereal Tech. 10-2
- Ohio Evaluation of Vegetable Varieties for Processing (Canning and Freezing). 1. Vegetables. To (1) evaluate new vegetable varieties as to (a) quality characteristics for processing, and (b) processed product yield; (2) recommend new varieties having desirable processing characteristics to growers and processors.  
Hort. 157-1

- Ohio            Evaluation of Fruit Varieties for Processing (Canning and Freezing). 2. Fruits. To (1) evaluate new and commercially important fruit varieties and selections as to quality characteristics after processing in relation to raw product quality; (2) determine processed product yields of these new and commercially important fruit varieties; (3) obtain experimental data on which to base recommendations to Ohio growers, processors, and consumers as to those varieties most suitable for processing.  
Hort. 157-2
- P. R.           Industrial Processing of Bananas and Plantains. To (1) study processing methods for (a) the production of banana puree from ripe Montecristo bananas and from plantains, (b) preservation of ripe bananas and plantains canned in sugar syrup, (c) producing plantain and banana chips; (2) develop food products as ice cream mixes, baking mixes, baby foods, and confections, using these fruits as starting materials.  
Food Tech. 107
- Texas          Processing and Handling of Texas Fruits and Vegetables. To (1) develop new or improved methods and instruments for objective measurement of quality of raw and processed products, as color of tomatoes and maturity or texture of southern peas; (2) determine effects of cultural treatment on composition of fruits and vegetables, and their products as to processing quality and nutritive value; (3) evaluate effect of various post-harvest environmental conditions and handling procedures on quality of fruits and vegetables; (4) evaluate breeding selections of fruits and vegetables as to processing characteristics; (5) develop new or improved fruit and vegetable products; (6) evaluate and/or develop packaging materials, containers, and techniques.  
Hort. 1126
- Wyo.           Testing Kinds and Varieties of Vegetables and Fruit in Wyoming. To (1) find disease resistant varieties of vegetables and fruits which will grow and produce high quality marketable yields in areas of different altitudes in Wyoming; (2) test and evaluate new kinds and varieties of vegetables and fruits grown at a high elevation for adaptability, freezing and dehydro-freezing qualities; and (3) determine factors affecting quality and nutritive properties of processed vegetables.  
Agron., Home Econ., Chem. 542
- Canning and Heat Treating
- Alaska         Chipping and French Frying Quality of Alaskan Grown Potatoes. To determine (1) if potato seedlings arising from Alaska's hybridizing program have the needed quality for chipping and frying; and (2) which of the adapted commercial varieties are best suited for chipping and frying.  
Hort., Home Econ. 17

- Ga.           Roasting Peanuts. To study chemistry of the process of roasting peanuts and determine effect of variations in the process on the resulting product.  
Chem. 62
- Ga.           Study of Sweet Potato Processing. To (1) determine losses in weight during peeling, trimming and processing sweet potatoes of different U. S. grades; (2) evaluate methods of peeling; (3) evaluate methods of packing for canning or freezing; (4) determine most satisfactory medium for packing; and (5) develop means of using sweet potatoes in other food products.  
Food Processing 75
- Ga.           Processing Okra. To (1) determine most satisfactory means of preserving or processing okra; (2) investigate means of mechanically separating tender and hard okra for marketing or processing.  
Food Processing ES-335
- Ill.          Quality of Canned Sweet Corn. The Effect of Thermal Processing on the Peroxidase System. To (1) determine time-temperature relationships for destruction of peroxidase in whole kernel corn at temperatures of 250°-300°F. (2) evaluate the following: (a) time necessary for irreversible destruction of peroxidase at various temperatures, and (b) rate of regeneration of peroxidase in samples stored at 32°, 70°, and 100° F.  
Food Tech. 50-395
- Ind.          Improved Marketability of Meat by Preparing Precooked and Frozen Products for Consumer Use. To (1) develop methods of pretreating and cooking of meat which will result in cooked, or cooked and frozen, products of good and uniform quality starting with meat of low quality; and (2) evaluate the economic feasibility of those methods and products for commercial marketing purposes.  
Agr. Econ., Home Econ. ES-345
- Ind.          The Effect of Cooking Methods Upon the Riboflavin Content of Meat. To (1) study extraction methods and standardize techniques of extraction and autolysis to be used in learning riboflavin content by fluorometric method; (2) test and control physical factors influencing fluorometric readings; (3) compare values obtained by rat-growth, microbiological and fluorometric methods; (4) continue studying effect of canning (cooking under pressure 10# for 75 minutes) on retention of riboflavin in comparable samples of ground beef; determine effect of simmering on retention of riboflavin in comparable samples of ground beef; and (5) compare results obtained with beef with those obtained with comparable cuts of pork.  
Home Econ. 820

- Mich.        Thermal-Processing of Cucumber Pickles. To (1) develop methods where processors can evaluate pasteurization process; (2) develop recommendations for continuous pasteurizing operations as heating and cooling cycle, and temperature control systems; (3) check present pasteurization recommendations under field conditions and develop pasteurization procedure for other pickle products where pasteurization is economical; (4) develop new methods and equipment for studying thermal-processing and improving on present commercial methods; (5) determine resistance of micro-organisms and chemical compounds to heat at different energy levels.  
Agr. Engin. 818
- N. Y.        A Comparison of the Effect of Electronic and Conventional (Cornell) Cooking on the Quality of the Product and Cooking Time. To compare effect of cooking in a home electronic oven, in an institution electronic oven, and in a conventional electric oven on subjective palatability qualities, cooking losses, cooking times, objective tenderness, objective color, and retention of thiamine, moisture, and fat.  
Food and Nutr. 199
- N. Y.        The Yield and Quality of Canned Peas from Raw Material of (State) Varying Maturity. To relate the yield and quality of the canned product to the maturity of the raw peas when harvested.  
Veg. Crops, Food Sci. and Tech. 4a
- Oreg.        Development of New Methods of Food Preservation. Chemical Agents Influencing Processing Schedules of Canned Meat. To select and apply new chemical preservatives to meat, especially to lower time and/or temperature of heating needed for preservation in canning process.  
Food and Dairy Tech. 103-1
- P. R.        Canning of Sweet Potatoes. To develop a process suitable for canning the different varieties of sweet potatoes grown in Puerto Rico.  
Chem. 65
- P. R.        The Canning of the Pigeon Pea. To determine (1) maturity indexes for harvesting at proper maturity; (2) most adequate procedures for size and maturity classification; (3) conditions necessary for adequate blanching; (4) most adequate canning procedure to control number of splits and prevent discoloration; (5) most adequate type of container for the product; (6) most adequate processing schedule; (7) behavior during storage; (8) factory control procedures and quality standards; and (9) canning quality of different pigeon pea varieties of P. R.  
Chem. 70

Wis. Strengthening Market Demands for Wisconsin Fruits and Vegetables by Developing New Utilization and Processing Methods-- Study of Consumers Preference for Levels of Sugar and Salt in Canned Fruits and Vegetables. To gain more needed information of the desired ratio of sugar and salt and the intensity of sweetness desired in the pack of certain vegetables, particularly peas.

Dairy and Food Industries 918 Coop. USDA

### Freezing and Cold Treating

Ga. Improving Present Practices of Freezing Fruits, Vegetables and Meats. To study (1) varieties of fruits, vegetables, and meats suited for freezing in locker plants and home units; (2) use of anti-browning agents and anti-oxidants--citric acid, ascorbic acid, sulphuric acid and others to extend storage life of frozen products; (3) type and methods of packaging to prevent desiccation, oxidation and flavor loss; and (4) better means to sweeten frozen fruits for optimum flavor, color, and texture, by using combinations of sucrose, dextrose and corn syrups.

Food Processing 72

Hawaii Preservation of Foods in Hawaii by Quick-Freezing. To (1) determine adaptability of tropical and sub-tropical fruits to preservation by quick-freezing; (2) determine techniques and procedures giving best quality frozen products; (3) determine storage life and nutritive value, especially ascorbic acid, of frozen preparations; (4) develop suitable procedures for freezing fruits, vegetables, poultry products, meat and fish in the home in Hawaii; and (5) conduct taste panels and cuttings for food quality, acceptability and consumer reaction.

Food and Nutr. 516

Ill. Home Freezing of Foods. To (1) determine best methods of freezing and how to improve those now used in state; (2) investigate suitability for freezing of varieties of fruits and vegetables; (3) find which cooked and prepared foods can be frozen; and (4) define conditions which must be fulfilled if optimum results are to be obtained.

Home Econ. 60-328

Ind. Methods of Processing and Packaging of Frozen Poultry in Relation to Institutional Cookery. To test the thesis that it should be possible to develop packages or package liners, methods of cutting and packaging, and freezing which would permit institutional kitchens to place frozen poultry directly in the oven to complete the cooking of partially cooked products, or to completely cook a frozen product.

Poultry Sci., Biochem., Home Econ. 776

- Ind.        Freezing of Poultry Meat. To determine (1) relative effectiveness of various freezing techniques on quality of poultry meat; (2) comparative costs between immersion freezing and wind tunnel freezing of poultry meat.  
Poultry Sci. 856
- Kans.      Effects of Varieties and Certain Treatments on Quality of Fruits and Vegetables Preserved by Freezing. To determine (1) suitability of new varieties of fruits and vegetables for freezing, and compare their desirability with well established varieties; (2) effects of pre-freezing treatments with solutions of Ca salts and/or other materials found to be suitable for use with fruits and vegetables; (3) effect of freezing techniques on texture of product.  
Hort., Home Econ. 233
- Ky.        Some Factors Affecting Firmness of Tissue Structure, Color and Palatability of Frozen Berries and Vegetables and Their Effect on the Ascorbic Acid Content of the Products. To (1) determine the effect of the following factors on the firmness of tissue structure, color, and palatability of frozen foods: (a) the addition of  $\text{CaCl}_2$ , calcium gluconate, and calcium pantothenate in two different concentrations to berries and vegetables as they are prepared for freezing, (b) icing berries and vegetables immediately upon harvesting and keeping them iced except for the minimum amount of time required for preparation for freezing, (c) same as (b) above, but adding  $\text{CaCl}_2$  to the ice in two different concentrations; and (2) study the ascorbic acid content of the frozen foods prepared for freezing by the different procedures noted above.  
Home Econ. 504
- Mass.      Home Preservation of Foods by Methods Other than Canning. To study such methods of home food preservation as dehydration or drying, freezing, salting, and pickling.  
Food Tech. 67
- Mont.      The Home Freezing of Foods. To investigate (1) freezing quality of varieties of vegetables and berries suited to climatic conditions of Montana; and (2) freezing of cooked and prepared foods using standard recipes with adaptations for altitude.  
MS 832 Home Econ. 29
- N. Y.  
(State)    The Yield and Quality of Frozen Apple Slices Prepared by Different Methods of Processing. To determine yield and quality of frozen material that may be obtained when apple slices are blanched by different methods after varying periods in cold storage.  
Food Sci. and Tech. 3b

- Oreg.      Labor and Equipment Efficiency in Freezing Oregon's Principal Fruit and Vegetable Crops. To (1) describe frozen food industry of state with emphasis on green peas and beans, sweet corn, and strawberries; (2) determine physical input-output relationships in raw material assembling and freezing operations; (3) determine comparative efficiency of different methods, organizations, and scale of operations used in assembling and freezing; and (4) estimate costs for assembling and freezing operations.  
Agr. Econ. 280 (WM-17) (See also Part 14, Section b)
- Pa.        Factors Involved in the Preparation for Freezing, Storing, and Preparation for Serving of Foods. To determine the influence on quality of certain technological factors encountered in the preparation, freezing and cooking of frozen foods, with particular reference to methods of preparation and handling previous to freezing, method and rate of freezing, time and temperature of storage, and methods of cooking and serving.  
Agr. Engin., Chem., Bact., Home Econ., Anim. Husb., Hort. 1065
- Pa.        The Effect of Maturity on the Market Value and Quality of Frozen Vegetables and Fruits. To obtain information on state of maturity of fresh products used for processing as it affects the final quality of the frozen food prepared for market and consumption.  
Food and Nutr., Chem. 1335-A
- Pa.        The Investigation of Non-Blanching Versus Blanching on the Final Quality of Vegetables Frozen for Market under Conditions of a "Quick Freeze." To determine (1) if a "quick freeze", one which limits time required to pass through zone of maximum crystallization to 5 minutes or less, will eliminate need for blanching (2) storage life of such products at 0° and -20 F.  
Food and Nutr., Chem. 1335-B
- P. R.      Conservation of Tropical Fruits and Vegetables by Freezing. To (1) study practical possibility of conserving different tropical fruit and vegetable varieties by freezing; (2) study changes occurring after harvesting and their effect on product quality; (3) study changes occurring during preparation, freezing cold storage, and thawing; (4) study vitamin retention of tropical fruits and vegetables on freezing, cold storage, and thawing; (5) determine most adequate types of containers or wrappers; (6) compare quick and slow freezing to learn their relative advantages and effects on quality of product; (7) determine if fruits and vegetables should be frozen whole, sliced, mashed, or pureed; (8) study shelf life of frozen fruits and vegetables; and (9) determine acceptability of frozen fruits and vegetables to prospective consumers.  
Food Tech. 109

Tenn. Preservation of Fruits and Vegetables by Freezing. To determine (1) quality under preservation by freezing, of Tennessee fruits and vegetables; (2) most suitable varieties and stages of maturity best suited for freezing; (3) best preparatory treatments of fruits and vegetables; and (4) relative protective qualities of the various wrapping and packaging materials commonly used in frozen-food work.

Chem. 83

Tenn. Influence of Rate of Cooling and Water Absorption on Shelf Life, Cooking Quality and Flavor of Chickens. To determine (1) relationship of cooling periods and cooling media to change in weight, carcass quality, and shelf life of various classes of poultry; and (2) relationship of cooling procedure to cooking characteristics and consumer acceptability of various classes of poultry.

Poultry 115

Wash. The Preservation of Fruits and Vegetables by Freezing. To (1) continue research for the improvement and development of frozen products and of processes used in freezing preservation of fruits and vegetables; and (2) study fundamental physical and chemical principles involved in freezing preservation.

Home Econ., Hort. 616

Wash. Cooling and Freezing of Poultry Meat. To determine (1) cooling and freezing rates for poultry; (2) differences in appearance of poultry cooled and frozen by various methods; (3) weight changes in fresh dressed poultry meat as influenced by methods of cooling and freezing; (4) effect of different methods of packaging poultry as an influence on freezing rates; (5) amount of moisture loss during thawing of meat as influenced by cooling and freezing methods; and (6) tenderness as affected by cooling, freezing, and thawing treatments.

Agr. Econ. 1275

#### Dehydrating and Drying

Ill. Drying and Curing Problems of Seed Sweet Corn and Popcorn. To determine factors causing injury to sweet corn seed during artificial drying and to work out methods of artificially curing popcorn for market.

Hort. 65-340

P. R. The Dehydration of Acerola Juice. To determine (1) procedures for making a powder from acerola juice; (2) usefulness of powder in fortifying juices and nectars with vitamin C.

Food Tech. 124



P. R.      Dehydration of Plantains and Bananas for the Preparation of Flours, Flakes and Powders. To (1) develop an economical processing method for preparing flour from green plantains and bananas; (2) develop an economical processing method for preparing flakes and powders from ripe plantains and bananas; (3) develop adequate packaging and storing procedures for these products; (4) determine shelf-life of products; and (5) find new uses for products and carry out consumers acceptance tests.  
Food Tech. 125

Tenn.      Home Preservation of Fruits and Vegetables by Dehydration. To determine (1) varietal suitability of a limited number of Tennessee-grown vegetables, and best stages of maturity for dehydration; (2) relative protective qualities of various containers for dehydrated foods and best home-storage conditions; (3) quality of the dehydrated products; and (4) improvement of the home dehydrator.  
Chem. 84

Cereal Milling and Baking Technology

Kans.      Wheat Conditioning. To (1) investigate interactions of wheat type, time, temperature, pressures, and moisture content on flour yield and flour properties; (2) determine the physical and chemical changes in wheat when subjected to the various conditions developed during conditioning.  
Flour and Feed Milling Industries 505

Minn.      The Biochemistry of Milling, Baking, and Macaroni Manufacture.  
1. Milling. 2. Baking and Macaroni Manufacture. 3. Wheat and Flour Constituents in Relation to Biochemical Properties of Cereal Foods. 4. Dough Ingredients Other than Wheat Products.  
To determine (1) fundamental principles involved in the conversion of wheat and typical wheat products into "bread stuffs," (2) quantity and nature of various wheat and flour constituents and their effect upon processing requirements; (3) function of typical ingredients of the formulas followed in manufacturing such foods.  
Biochem. 1503, -1, -2, -3, -4 Coop. Dept. of the Army--QMC

Mont.      The Milling and Baking Quality of Montana Bread Wheats.  
To (1) evaluate the milling and bread-baking quality of wheat hybrids and varieties being tested in State; (2) evaluate and refine laboratory micro-quality tests and determine minimum size of field plots required to supply sufficient material for reliable quality tests; (3) evaluate effects of cultural practices and environmental factors on milling and bread-baking quality of wheat varieties; (4) determine relation existing between chemical and physical properties of wheat, flour, or flour doughs, and their milling or bread-making characteristics.  
Agron., Soils 1079 Coop. ARS

- N. Dak.      The Effect of Forced Air Drying on the Quality of Malting Barley and Durum Wheat. To determine effects of drying with forced air at different temperatures on (1) germination and malting quality of barley; (2) milling and macaroni processing quality and germination of durum wheat.

Agr. Eng., Cereal Tech. 4-7

### Oilseed Processing

- Okla.      Nutritional and Chemical Evaluations of the Castor Plant (Ricinus Communis). To (1) evaluate practicability of producing an animal feed from castor pomace, by removing toxins and the allergens; (2) investigate biosynthesis of alkaloid, ricinine in seedling; (3) as data is obtained, broaden scope to include: determining biological value of protein of extracted pomace, amount of ricin, ricinine and allergen from castor pomaces derived from different varieties of Ricinus communis, amino acid content of these proteins, isolating and identifying new amino acids from ricin and allergen.

Biochem. 1009

### Evaporating and Concentrating

- Miss.      Chemical Studies Related to the Quality of Sorgo Juice for Sirup and Sugar Production. To evaluate various factors that influence the quality of sorgo juice for sirup and sugar production.

Chem. HF-1 Coop. ARS

- P. R.      The Preparation of Juices, Nectars, and Concentrates from Tropical Fruits. To (1) find optimum conditions for extraction, preservation, and canning of tropical fruit juices, nectars, and concentrates; (2) study keeping quality of canned juices, nectars, and concentrates; (3) determine through organoleptic tests the acceptability by consumers of prepared products; and (4) to guarantee production of uniform quality packs, work out quality standards for new products developed.

Chem. 29

- P. R.      The Utilization of Tropical Fruits in the Preparation of Juices and Pulpes for Remanufacturing Purposes. To develop industrial procedures for preparation of juices and nectars from tropical fruits for remanufacturing into jellies, jams, pastes, butter, baby foods, soft drinks, and ales.

Chem. 67

- Tenn.        Factors Affecting the Quality of Strawberry and Other Fruit-Juice Concentrates. To (1) prepare strawberry and other fruit-juice concentrates; (2) study such factors as temperature and time of heating of the berries and expressed juices: deaeration of the juices by inert gases; amounts and kinds of sugars used; addition of anti-oxidants; and kinds and varieties of fruit as they affect flavor and keeping quality; and (3) determine by chemical analysis the nutritive value of fruit-juice concentrates.  
Chem. 82

### Jellying and Preserving

- Ga.        The Development of New Uses for Processed Watermelon and Cantaloupe Products. To determine (1) economical means of utilizing rinds as preserves, pickles, glazed rinds, candy centers, etc.; (2) uses of watermelon juice as a beverage, as a source of vinegar, other fermentable, or pharmaceutical material; (3) use of cantaloupes as frozen product for cocktails and desserts, and as a constituent of pickles and preserves.  
Food Processing 74
- P. R.      Preparation of Guava Paste. To (1) determine characteristics which guava pulp must have so that it may be suitable for paste manufacture; (2) determine the characteristics which the extracted guava juice must have so that it may be suitable for jelly manufacture; (3) develop control procedures for cooking the paste and extracted juice to uniform consistency and color; (4) study the nature of the darkening of both paste and jelly during storage and develop procedures for preventing or retarding this discoloration; (5) study keeping quality of jellies and pastes during storage at 85° F. and at other convenient temperatures; (6) study procedures for the depectinization of guava juices and the addition of commercial pectin in order to improve the uniformity of the jellies produced therefrom; (7) correlate organoleptic properties of the jellies and pastes with their chemical analyses; and (8) search for better containers, especially for pastes, which are more practical and convenient than the ones now in use.  
Chem. 66

### Curing, Brining, Salting, Smoking, Pickling

- Ark.      Factors Affecting the Preservation of Cured Pork. To compare various methods of preservation of pork by the cures now available and determine the effects of such factors as elapse of time from slaughter until carcass is chilled, various methods of making carcass cuts, and relative humidity upon preservation of pork cuts in order to determine best methods of curing and handling cured pork.  
Anim. Indus., Vet. Sci. 336

- Ga.            Curing and Smoking Pork and Turkeys. To determine (1) best procedure for curing and smoking pork and mature turkeys in freezer lockers and on farm; (2) best method of handling same before and after curing and smoking; (3) consumer preference for pork and turkeys cured and smoked.  
Food Processing 76
- Ky.            The Effect of Smoking and of Smoking at Different Temperatures on the Shrinkage, Rancidity, and Palatability of Dry-Cured Hams. Compare effect of smoking, and of smoking at different temperatures, on shrinkage, rancidity, and palatability of dry cured hams that will be aged under constant controlled temperature and humidity.  
Anim. Indus., Agr. Econ. 1008
- Mo.            Stability in Cured Meats Using Ascorbic Acid and Other Stabilizers. To determine (1) if ascorbic acid, singly or in combination gives enough improvement in curing time or other advantages to justify cost of its use; and (2) some idea of optimum levels of ascorbic acid required.  
Anim. Husb. 100
- N. Y.  
(State)        Pure Culture Inoculation of Fermenting Cucumbers. To determine effect of various acid producing bacteria upon fermentation of cucumbers in brine.  
Food Sci. and Tech. 3c
- N. C.            Microbiological and Chemical Changes Occurring in the Curing of Meat. To ascertain the role played by micro-organisms and to follow certain changes occurring in the curing of meat.  
Anim. Indus. H-15 Coop. ARS
- N. C.            The Commercial Brining of Fruits and Vegetables. To study (1) improvement of existing salting methods for certain vegetables to reduce losses; (2) extension of salting procedures to many vegetables not now commercially brined; and (3) brining of surplus portions of certain fruit crops as a temporary preservation method.  
Hort. H-78 Coop. ARS
- Ohio            Studies in the Processing of Fresh Meat. Biochemical and Bacteriological Studies Fundamental to the Processing of Fresh Meat. To find methods of processing fresh meat which will upgrade the less desirable carcasses; permit greater quality control along the lines of palatableness; diminish the great variation in consumer acceptability resulting from breeding, nutrition, and handling; augment effectiveness of refrigeration in preserving meat; and prevent certain spoilage such as "bone sour."  
Anim. Sci. 70

Tenn.        Ripening of Beef from Cattle Produced Under Different Feeding Methods as Related to Palatability, Tenderness and B-Vitamin Content. To (1) study flavor, tenderness, and vitamin B-complex content of beef from cattle finished mostly on grass, and effects of various degrees of ripening on flavor, tenderness, and vitamin B-complex content of beef; (2) determine if there is an optimum degree of ripening for given grade of beef which will make best quality meat, considering flavor, tenderness and vitamin B-complex content; and (3) measure cooking effect on B-complex.  
Home Econ., Anim. Husb., Vet. Sci. 67

Va.         Processing and Merchandising Meats from Animals Produced under Virginia Farm Conditions. To (1) investigate procedure and develop ways of processing and merchandising meats from (a) cattle and sheep produced under Virginia farm conditions and (b) hogs fed, managed and bred so as to increase ratio of lean to fat in carcass; (2) devise means of estimating carcass value in live animals; (3) develop procedures for more precise evaluation of carcasses from meat animals in breeding, feeding, and management research; and (4) investigate methods of curing and storing home meat supplies.  
Anim. Indus., Agr. Econ. 86074

#### Extracting, Enriching and Storing

Mo.         Studies to Improve Food Utilization and Selection, Preparation, and Storage Facilities. To make studies to provide bases for recommendations for preparation of foods of high nutritive value which will help to educate homemakers and to counteract the effect of misleading advertising.  
Home Econ. 163

#### Irradiating

Fla.        The Nutritive Value and Storage Characteristics of Cobalt-60 Irradiated Foods and Feeds. Develop techniques for maintaining the nutritive value and palatability and extending storage period of foods and feeds preserved by irradiation with Co-60 at pasteurization and sterilization levels.  
Anim. Husb., Food Tech. and Nutr. 849

Idaho

Effect of Irradiating Russet Burbank Potatoes with Radio-Active Fission Products Upon their Storage and Market Qualities, Disease Prevention and Killing of Nematodes Contained Within the Tubers. To determine (1) dosage of irradiation from fission products that will inhibit sprouting of Russet Burbank tubers; (2) effect of said treatment on taste, cooking and processing qualities, flesh color and greening of skin under normal retail conditions; (3) loss during storage due to rots, shrinkage, and sprouting compared to non-treated tubers, (4) temperature that will allow least moisture sprout, and rot loss to treated tubers; (5) how long marketing can be extended by use of treatment and still receive consumer acceptance; (6) best time for using treatment to expect best results; (7) possible effect of irradiation of tubers in delaying expression of Verticillium wilt through modification of dormancy; (8) if said dormancy can be broken by use of ethylene or other chemicals; (9) if Ditylenchus destructor can be killed by irradiation without injuring table quality.

Hort. 268 Coop. AEC

Idaho

Application of Di-electric Heating in the Processing and Marketing of Cheese. To determine if microbiological activity in cheese can be stopped by dielectric heating of cheese in package, and if dielectric heating of cheese curd, in manufacturing process will reduce time required to cook out cheese and improve quality of cooked cheese curd. Develop continuous or semi-continuous cheese making operations with use of dielectric heating.

Dairy Indus. 275

Ill.

A Study of the Bactericidal Effects of Ultrasonic Waves in Dairy Food Products. To determine applicability of ultrasonic waves to sterilization of dairy and food products.

Food Tech. 50-383

Ill.

Effect of Low Levels of Ionizing Radiation on the Storage Life of Refrigerated Chicken. To (1) determine effects of low levels of ionizing radiation on storage and marketing of dressed chicken; evaluate storage life, under refrigeration, of irradiated and non-irradiated chicken, and the organoleptic properties of stored chicken at selected intervals during storage.

Food Tech. 50-394

Mich.

Irradiation of Fruits and Vegetables. To (1) determine effectiveness of ionizing radiations in extending shelf and storage life of fruits and vegetables; (2) study undesirable changes in color, texture, and flavor occurring in fruits and vegetables as a result of irradiation; (3) determine effects of irradiation on metabolic activities of fruit and vegetable tissues.

Hort. 845

- Mich. The Effects of Accelerated Electron on the Physical and Chemical Characteristics of Milk Proteins. To observe effect of accelerated electron radiation on chemical and physical properties of milk protein system.  
Dairy, Agr. Engin. 863
- Mich. The Effect of High Voltage Cathode Ray Ionizing Radiation on Some Chemical Properties and on the Biological Value of Wheat Protein. To (1) determine if irradiation has an effect on availability (expressed as biological value) of wheat protein to the animal body; (2) by chemical means study any changes occurring in wheat protein as result of irradiation.  
Food and Nutr., Agr. Engin. 864
- Mo. Control of Microbial Development During Meat Processing. To control microbial development during meat processing by use of ultra violet radiation.  
Anim. Husb. 257
- Ohio Comparison of Fruits and Vegetables Processed by Radiation Sterilization with the Same Fruits and Vegetables by Canning and Freezing. (1) To evaluate nutritional and quality differences of fruits and vegetables processed by means of radiation sterilization when compared to same items processed by canning and freezing. (2) To study effects of radiation sterilization on nutritional and quality differences of: (a) several varieties known to differ in their adaptability for canning and/or freezing, for each commodity, (b) fruits and vegetables when processed at different maturity stages.  
Hort. 152
- Pa. The Recovery of Microorganisms from Ultraviolet and Visable Light Radiation Damage. To (1) quantitate killing by visible light radiation and observe possible recovery methods; (2) explore possibility that a single mechanism is responsible for most types of recovery; (3) study possible interrelationship between killing and recovery by radiation from ultraviolet and from the visible portion of spectrum.  
Bact. 1289

FOOD PRODUCT AND PROCESS DEVELOPMENT

Primary Food Products

A. Dairy Products (See Part 6, Dairy Technology)

B. Poultry Products

Eggs

- Colo. Factors Influencing the Quality of Eggs Sold Through Colorado Markets. To (1) determine quality of eggs at time of purchase by wholesalers; (2) determine quality of eggs in retail stores; (3) study methods of handling and storage in market channels on state markets; (4) study storage qualities of eggs entering market.  
Poultry, Econ. 56
- Iowa Poultry and Egg Marketing: Technological Aspects--Measurements of Quality in Poultry and Egg Products Using Subjective and Objective Tests. To (1) establish criteria of quality for eggs and poultry products; (2) determine what factors affect decline in quality of poultry and eggs during processing and storage; (3) develop methods for maintaining quality in poultry and eggs in time between producer sale and consumer purchase; (4) evaluate efficiency of new methods which might reduce losses or minimize changes in quality of poultry and egg products; (5) develop reliable objective tests for use in estimation of quality in eggs and poultry; and (6) establish procedures for subjective evaluation to accurately measure differences in fresh, processed and stored eggs and poultry.  
Home Econ., Poul. Husb., Bact. 1026 (NCM-7)
- Kans. To Develop and Improve Methods of Preserving Eggs or Egg Products and to Prevent Bacteriological or Physical Deterioration. To (1) determine causes of deterioration of eggs and egg products during processing and storage; and (2) develop means of increasing storage life, shelf life, and wholesomeness of these products.  
Poultry Husb., Bact. 388
- Kans. Nutrition and Biochemistry of the Quality and Composition of Eggs. To study nutritional factors influencing quality of eggs, and investigate composition and characteristics of yolk protein of eggs produced under various environmental conditions.  
Poultry Husb. 502
- Md. Development of Improved Objective Methods for Detecting Meat Spots in the Hen's Egg as Related to Quality in Egg Marketing. To (1) study basic composition of meat spots, so characteristic components can be identified; and (2) develop a rapid and reliable objective method or device for their detection, which can be adapted for use in mechanized processing lines to eliminate hand operations.  
Poultry Husb. M-51



- Mich. Cause and Prevention of Egg Yolk Discoloration Resulting from Feeding Cottonseed Oil to Laying Hens. To study (1) prevention of pink whites and salmon yolks by feeding the hen possible antagonists to the causative substance in crude cottonseed oil; (2) isolation and characterization of the substance in crude cottonseed oil that causes discoloration; (3) inactivation of or removal of causative agent from crude cottonseed oil; (4) mode of action of causative substance on the yolk membrane.  
Agr. Chem., Poul. Husb. 63
- Mich. Effects of Washing and Freezing Eggs on Quality. To study (1) and evaluate effects on egg quality of process of washing eggs in an oil emulsion solution in which a sanitizer and detergent have been incorporated; (2) possibilities of preserving frozen shell eggs.  
Poul. Husb. 81
- Mo. Relationship of Certain Physical, Chemical, and Micro-Biological Properties of Eggs to the Preservation and Utilization of Shell Eggs and Egg Products. To determine (1) fundamental causes for deterioration of chick white gel structure and relation of these factors to performance of egg white; (2) effect of CO<sub>2</sub> on pH of white and its effect on preservation of thick white gel structure at various storage temperatures. (3) Explore importance of various handling methods and treatments toward retaining "quality" in shell eggs and egg products. Determine (4) influence of season and age of bird on shell egg quality, egg composition and functional properties of white; (5) effect of chemical additives on functional properties of egg white products. (6) Study effectiveness of fermentation techniques ("resting cell") and possible use of chemical blocking agents to retard browning reaction in whites. (7) Devise methods for modification and use of yolk and chalazal fraction of white.  
Poultry 17 (NCM-7)
- Okla. Physical-Chemical Studies of Egg Shell Quality. To study physical-chemical structure and mineralization pattern of normal egg shell as related to shell strength and to intensity and duration of egg production.  
Poul. Sci. 1005
- Pa. The Heritability of Certain Egg Quality Characters, the Genetic Correlation Between Them, and the Relation of Such Characters to Production. To (1) measure heritability of certain egg quality characters; (2) determine genetic correlation between various factors affecting egg quality; and (3) study relationships existing between certain egg quality characters and other reproductive characters.  
Poul. Husb. 1199-A (NE-6) (See also Part 19)

- Pa.            The Influence of Energy-Fiber Concentrations and Protein Source of the Diet on Certain Egg Quality Characteristics. To study the influence of energy-fiber concentrations and protein source of the diet on the following egg quality characteristics: U. S. grade, albumen condition, incidence of blood and meat spots, shell thickness, and yolk color.  
Biochem., Poultry Husb. 1199-B
- Pa.            Seasonal Variation of Shell Quality in Chicken Eggs. To (1) study shell quality of eggs produced under conditions of different temperature and relative humidity; (2) study physiological mechanisms causing reduction of shell quality when pullets are kept at high environmental temperatures; (3) find ways to produce sound shells under high temperatures and relative humidities.  
Poultry, Agr. Engin. 1199-C
- Pa.            Shell Porosity and Quality Deterioration of Market Eggs. To (1) evaluate existing porosity determination methods in relation to quality deterioration of market eggs and seek method of greater accuracy and speed; (2) study relation between shell porosity and quality loss of market eggs; (3) study effect of shell treatments and storage practices on shell porosity and quality deterioration of market eggs.  
Poultry Husb. 1199-D
- Tex.           Penetration of Egg Shells and Proteolytic Decomposition of Egg Proteins by Organisms of the Genus Pseudomonas. To determine (1) with known species of genus Pseudomonas, the role of different parts of egg shell and membranes in resisting bacterial penetration; (2) type and rate of protein breakdown by single strains and mixed cultures of genus Pseudomonas.  
Agr. Econ. & Sociol., Poultry Sci., Dairy Sci. 1085
- Wash.          Comparative Efficiency and Acceptability of Several Methods for Preserving Quality of Shell Eggs. To determine (1) relative efficacy of thermostabilization, CO<sub>2</sub>, oil treatment, and plastic treatment of shells in preserving interior quality of shell eggs during marketing; (2) which of above methods is most economical.  
Poultry Sci., Home Econ. ES 404

### Poultry Meat

- Colo.          The Influence of the Color and the Amount of Carcass Fat on the Market Grades of Dressed Turkey. To (1) determine amount of fat on turkey carcass without resorting to a total carcass analysis and develop method of measuring carcass fat color; (2) correlate color and amount of fat found in turkeys of known nutritional background with grade given these turkeys; (3) determine variation in color and amount of carcass fat marketed commercially in area; (4) determine consumer preference for color and quantity of fat in frozen turkeys; (5) relative roasting quality of frozen turkeys of different fat color and quantity and correlate this with consumer preference.  
Poultry 54

- Del. Effects of Scald on Processing, Carcass Quality, and Chemical Changes in the Skin of Broilers. To determine effects of conditions of scald from 128-140°F. for period of time on ease of removal of feathers, quality of carcass, chemical changes in proteinaceous and lipid components of skin of broilers.  
Anim. and Poultry Indus. 8-PI
- Del. Chemical Aspects of the Marketing of Poultry Meat. To (1) develop improved techniques for maintaining quality of chickens from the farm to consumer; and (2) establish a physioco-chemical basis for changes in quality which occur as a result of the storage of ready-to-cook poultry.  
Agr. Chem. 28-C
- Del. Causes and Development of Bruises During the Marketing of Broilers. To (1) study possible effects of marginal vitamin E, calorie-protein ration, added fats and fatty acids, high salt levels before slaughter, etc., on susceptibility of broilers to bruising during marketing; (2) study biochemical and physiological changes in bruised tissues including: hemoglobin breakdown products, concentration of electrolytes, peroxide levels, and tocopherol levels as an aid in locating procedures in marketing likely to cause bruises.  
Anim. and Poultry Indus. 59-PI
- Ind. Extending the Shelf Life of Fresh Dressed Poultry. To determine (1) effect of various fungistats and fungicides (used with antibiotic treatment) on development of yeasts; (2) storage life which can be obtained by use of chlorinated water in chill tanks, in addition to antibiotics.  
Poultry Sci. 775
- Ind. The Effects of Processing, Holding (During Marketing), and Preparation for Consumption of Poultry Meat Upon its Tenderness and Flavor. To determine effects of various methods of processing, holding, storage, and preparation of poultry meat upon tenderness, juiciness, flavor, and other organoleptic properties.  
Poultry Sci., Home Econ. 836
- Iowa Effect of Pretreatments and of Type of Packaging Material on the Quality of Fresh and Frozen Broilers in Market Channels. To (1) investigate methods for extending the market life and/or maintaining the quality of poultry products in packaged form; (2) evaluate the efficiency and effectiveness of different types of packaging materials; (3) evaluate the practicality and effectiveness of pretreatments: (a) to minimize seepage of fluid from cut tissues of broilers packaged and sold fresh, and (b) to improve the acceptability of frozen birds; (4) investigate methods of controlling microorganisms associated with development of off-odor, slime, and other manifestations of spoilage of ice-packed broilers; and (5) evaluate predominant organoleptic and microbiological changes which occur during handling and storage of fresh and frozen poultry.  
Home Econ., Poultry Husb., Bact. ES 304

- Kans. The Percent Shrinkage and Quality of Turkeys and Broilers in Market Channels. To investigate percent shrinkage of dressed turkeys and broilers during dressing, storage, and cooking, in order to determine condition under which most pounds of salable product may be produced.  
Poultry Husb., Chem., Home Econ. 387 (NCM-7)
- Ia. The Effects of Hormonization of Eviscerated Yields and Market Quality of Caponettes as Compared to Broilers. To (1) compare broilers with caponettes regarding dressing percentages, market quality, and return to producers; (2) determine most satisfactory age to administer hormones, amounts to administer, and which one is most satisfactory; (3) rate amount of fat deposition as it might effect consumer acceptance.  
Poultry Indus. 953
- Ia. The Effect of Chemical Composition of Eviscerated Poultry on Market Quality and Consumer Acceptance. To determine (1) relationship between chemical composition of eviscerated carcasses of broilers, fryers, and roasters, and yield of cooked carcasses and cooking losses; (2) effect of chemical composition of carcasses of broilers, fryers, and roasters on consumer acceptance of cooked carcasses with regard to: flavor, dryness, juiciness, and physical appearance.  
Poultry Indus. 957
- Maine The Determination of Quality Losses in Handling and Processing Broilers and Suggested Remedial Measures. To determine (1) nature, cause, and amount of loss in quality of broilers during the pick-up operation and in each phase of processing; and (2) costs and returns of various methods designed to reduce the amount of quality losses.  
Agr. Econ., Poultry Husb. ES 392
- Md. Quality Retention in Poultry Meats as Influenced by Methods of Processing. To study (1) use of CO<sub>2</sub> and various other anesthetizing agents and their effects on blood loss, ease of feather removal, and tenderness; (2) effect of different methods of killing on nervous control of feather muscle; (3) interrelation of time and temperature of scalding as influenced by killing method; (4) effect of above variations in processing procedures on quality and appearance.  
Poultry Indus. M-100
- Mich. Poultry Meat Products. To determine (1) suitable processing techniques and methods of handling off-grade, low grade, and other poultry with less consumer demand; (2) yield and cost of preparation of various classes of poultry meat; (3) new processing methods and new items so that a greater variety of products are available; (4) consumer preferences and acceptance of old and new poultry meat products; and (5) factors in quality deterioration and means to minimize losses.  
Poultry Husb., Agr. Physiol. 107

- Minn.      A Study of Moisture Levels in Processed Poultry. To (1) study effects of moisture level in processed poultry on cooking losses, yields of cooked edible meat, and palatability; (2) compare keeping quality of low and high moisture level birds, fresh and frozen; and (3) study factors affecting water absorption and retention by poultry during the chilling process and subsequent thereto.  
Poultry Husb. 2314
- Mo.        Factors Affecting the Flavor of Poultry. To determine (1) relationship of kind and amount of ingredients in ration to flavor of cooked broilers, fowl, roosters, and turkeys; (2) influence of present processing methods on flavor changes in cooked birds; and (3) influence of packaging materials and storage conditions on flavor stability.  
Poultry Husb. 313
- Mo.        The Factors Affecting the Palatability and Nutritive Value of Poultry. To determine (1) loss of water soluble organic material due to processing; (2) possibility of nutritive loss due to packaging materials and storage conditions; (3) amount of heat labile vitamins, essential amino acids (lysine and methione) in raw meat and meat fried, roasted or broiled. (4) Conduct palatability tests on poultry prepared by different processing methods and cooking procedures to determine which will produce better products.  
Home Econ. 314
- Mo.        Methods of Processing Poultry for Commercial Precooked Frozen and Canned Products. To (1) compare various cooking procedures for tenderness and cooking losses; (2) develop methods for cooling meat before boning to improve shelf life and wholesomeness; (3) study various cooling temperatures and time periods of bone, precooked meat for prolonged shelf life and low bacterial counts in finished, frozen or canned product; (4) study effect of freezing temperature and time for tenderness, flavor, storage life, and wholesomeness.  
Poultry Husb. 323
- Mont.      Processing, Packaging and Shelf-Life of Fresh Dressed Poultry. To determine (1) if the addition of fat to a diet will effect shelf-life of poultry; (2) what effect temperature of scalding water has on shelf-life; (3) effect the addition of antibiotics and bactericides (as chlorine compounds to cooling water) prior to packaging has on shelf-life. (4) Study various types of packaging in relation to shelf-life.  
Poultry Indus. MS 997

- N. C.        Shelf Life of Fresh and Previously Frozen Broiler-Fryers as Affected by Time Held in Slush Ice After Evisceration. To determine (1) moisture uptake of eviscerated broiler-fryers held in slush ice for 1, 3, 5, or 24 hours; (2) if relationship exists between amount of moisture uptake in slush ice cooling and bacterial contamination of eviscerated broiler-fryer carcasses; and (3) if relationship exists between holding time in slush ice and shelf life of fresh and previously frozen broiler-fryers.  
Poultry Sci. HM-19
- S. C.        Investigation of Methods for Increasing the Utilization of Poultry. Increase potential for use of poultry through development of ready-to-eat or prepared items.  
Food Tech., Nutr., Poultry Husb. 421
- Tex.        An Analysis of Processing Methods and a Comparison of Operational Efficiencies in Selected Texas Poultry Plant. To determine (1) relative number of broilers or turkeys processed per man hour in processing plants; (2) factors within operations of plants responsible for differences in productivity per man hour; and (3) influence of handling practices and plant operations on quality of carcasses sold to consumer.  
Poultry Husb., Agr. Econ. ES 260-1 Coop. USDA
- Va.         The Improvement of the Market for Poultry and Poultry Products through the Development and Application of a Broader Knowledge of Processing Technology. To (1) develop processing techniques to reduce processing defects, decrease carcass shrink and destruction of nutrients, retard deterioration, preserve desirable flavor and increase tenderness, juiciness and overall acceptability of poultry and poultry products; (2) develop new poultry products as sausages, loafs, salads, soups, precooked and frozen items with or without stuffing or garnishes which would have high consumer appeal and could be economically produced and marketed; (3) increase efficiency of marketing process through development of more practical uses for poultry offal; and (4) develop practical application of results of study to the industry.  
Poultry Husb., Agr. Econ., Statistics 86079
- Wash.       Shelf Life of Fresh Poultry Meat and Its Relationship Practices and Costs. To (1) evaluate methods of increasing shelf-life (non-frozen) with respect to microbial growth, off-odor, appearance, and flavor; (2) evaluate methods with respect to consumer acceptability; (3) determine effects of increasing shelf-life on processing and merchandising.  
Home Econ., Poultry Husb., Agr. Econ. ES 400

C. Meat (Pork, Beef, Veal, and Lamb)

- Ga. Carcass and Meat Characteristics as Influenced by Breeding, Feeding and Management Treatments in Cattle, Sheep and Swine. To (1) obtain data on carcasses fattened on grass, drylot, or combinations of these under local conditions; (2) study relationship of breeding, feeding, and management treatments on carcass and meat characteristics; (3) use above data in developing procedures for producing meat for consumer preferred type animals.  
Anim. Indus. 113
- Ill. Carcass Quality of Lambs as Affected by Different Feeds and Feeding Practices. To study effect on carcass quality of lambs of physical form and chemical composition of fattening rations.  
Anim. Sci. 20-331
- Iowa Changes Occurring in Self-Service Meats Stored at Low Temperatures. To (1) investigate influence of microorganisms in accelerating discoloration phenomena associated with fresh and cured meats stored under conditions simulating those found in retail markets; (2) investigate possibility that enzymes are involved in the development of the undesirable colors associated with "greening" of meats; (3) evaluate predominant organoleptic changes which attend storage of meat at certain temperatures above and below the freezing point and to investigate the relationships that may exist between changes in color and/or microbiological populations and flavor; (4) investigate methods of packaging and/or incorporating additives (antioxidants, curing agents, antibiotics) which result in preservation of original quality of fresh and cured meats stored at certain temperatures above and below the freezing point; and (5) investigate the effect of wave length and intensity of light upon the microbiological, chemical, and organoleptic quality of fresh and cured packaged meats.  
Dairy and Food Indus., Home Econ. 1264
- Iowa Beef Skeletal Muscle Connective Tissue in Relation to Tenderness in Meat. To investigate fundamental causes of the toughness or tenderness of meats and evaluate connective tissue of beef skeletal muscles as they relate to these problems.  
Home Econ., Anim. Husb. 1313
- Kans. Effect of Internal Temperature on Weight Losses, Cost Per Serving, and Palatability of Chilled Top Round Roasts. To determine (1) effect of internal temperature on weight losses, cost per serving, and palatability of chilled top round roasts graded U. S. Choice and U. S. Good when cooked at 300°F. to internal temperatures of 176°, 185°, 194°F.; (2) average cooking time per pound for roasts cooked to the designated internal temperatures. (3) Study effect of adding 30 to 40# of chilled meat to an oven preheated to 300°F.  
Home Econ. 436 (NC-31) (See also Part 13, Section d)

- Kans. The Effect of Level of Dietary Iron Upon Carcass Quality of Pork, Beef, and Lamb. To study effects of dietary Fe and/or Cu (1) in beef cattle, sheep, and swine rations on growth, carcass characteristics (color of lean, texture and firmness), and palatability factors (tenderness, juiciness, and flavor); (2) and on myoglobin content of longissimus dorsi, semimembranosus, semitendinosus, and biceps muscles, also Cu and Fe content of hemopoietic organs; (3) on quality and palatability factors of cured meats.  
Anim. Husb., Chem., Home Econ. 524
- Ky. A Study of the Keeping Quality and Shrinkage of Cured Pork from Hogs of Different Degrees of Fatness. To (1) study relative cut out values of pork carcasses from hogs of different degrees of fatness; and (2) determine shrinkage, keeping ability, and rancidity development of cuts from such carcasses.  
Anim. Husb. 256
- Ky. Factors Affecting Carcass Characteristics of Beef Cattle. To evaluate factors affecting carcass characteristics of beef as produced in State: creep feeding of beef produced by Kentucky Cow and Calf plan; effects of breed of dam (R d Poll and Hereford) when bred to same Hereford bull, on quality of beef; effect of different pasture forages on eating quality of beef.  
Anim. Husb. 267
- Minn. Preparation and Preservation Factors in Relation to the Nutritive Value and Palatability of Meat.--2. The Effect of Freezing and Freezing Storage Upon the Quality of Meat. To determine the factors which the homemaker must take into consideration in order to have meat of good quality when preserving it by freezing storage.  
Home Econ., Anim. Husb. 2003-2
- Miss. Economic Studies on Processing and Distribution of Livestock and Livestock Products.--The Economics of the Meat Processing Operations of Frozen Food Locker Plants. To (1) determine importance of small meat processing operations as an outlet for meat animals; (2) determine cost of processing operations in these types of firms; (3) relate cost of performing these processing services to volume and seasonality of operations; and evaluate effects of operations of frozen food locker plants in connection with meat packing operations on efficiency of resource use within such firms.  
Agr. Econ. RRFA-6 (SM-7) (See also Part 14, Section c)
- Mo. The Tenderness of Meat as Related to Tissue Components, Genetic Factors and Ante-Mortem and Post-Mortem Treatment. To determine (1) tissue components responsible for variations in meat tenderness; (2) influence of genetic factors, stress and post-mortem environment on muscle composition and tenderness. (3) Develop methodologies to evaluate effects of breeding, management, processing, and cooking on meat tenderness.  
Anim. Husb. 327



- N. C.            Determination of Objective Measurements of Flavor of Aged Country Hams. To evaluate units of measurements developed in prediction equation used in expressing aged ham flavor.  
Anim. Indus. HM-9
- N. Dak.        The Extent, Nature and Causes of Variation in Carcass Value of Cattle. To (1) develop measures for carcass evaluation for determining difference in consumptive value and quality; (2) determine extent and source of variation in percent of lean, fat, and bone and quality determinations in carcasses; (3) determine correlation of percent of lean to size of various muscles and bones which might be measured; (4) study relation of glandular size to carcass characteristics; (5) study efficiency of various methods of estimating outside cover of fat. (6) Compare live vs. carcass grades and cut-out values of carcass of different grades under different price-quality relations. (7) Determine repeatability of variations in carcass characteristics of genetically related steers.  
Anim. Husb., Vet. Sci., Agri. Econ. 7-10
- Wash.         Factors Influencing the Desirability and Nutrient Content of Meat and Meat Animals for Human Consumption. To determine effects of (1) genetics, nutrition, and other factors on carcass quality of meat animals and on quality and nutrient content of meat, and (2) storage, processing and preservation on quality, nutrient content, physical structure, and economic value of meat and meat products.  
Anim. Husb. 1161
- Wyo.          The Biochemical Changes Affecting Quality in Stored Packaged Meats. To determine (1) influence of constant and fluctuating storage temperatures on quality of beef and lamb; (2) chemical and biochemical changes causing deterioration of quality of beef and lamb during storage. (3) Apply information from above to develop new preservation methods.  
Agr. Research Chem., Anim. Production, Home Econ., Vet. Sci. 667
- D. Vegetable and Field Crop Products
- Ill.          Soybeans and Soybean Products as Human Food. To (1) investigate desirability of soybeans and their products for human consumption; (2) study suitability of different varieties for cooking and processing and determine chemical constituents of soybeans to ascertain why they differ in culinary qualities from other legumes and if treatments of beans might be modified to make them more acceptable.  
Home Econ. 60-324

Kans. The Comparative Quality and Nutritive Value of Market Fresh and Commercially Frozen and Canned Vegetables. To (1) compare quality, nutritive value, and cost of fresh, frozen, and canned vegetables when purchased on local market; (2) determine if there are indications of seasonal differences in quality and nutritive value of these vegetables as purchased; and (3) compare, when possible, the quality and nutritive value of market fresh and commercial frozen products with home-grown fresh and frozen ones.

Home Econ. 363

#### E. Fruit and Nut Products

Mo. Technology of Apple Products. To (1) develop a technique for making a good frozen concentrated apple cider which would appeal to the consuming public, characterizing the quality factors of astringency, body, relative sweetness, color, flavor, and aroma for each variety; and (2) develop a continuous mechanical device for apple juice extraction that would be better as to yield, quality, and sanitation than the present batch-wise presses.

Hort. 233

Tenn. Factors Affecting Technology, Quality and Consumer Opinions of Colloid-Treated Strawberries Preserved by Freezing. To determine (1) how quality of frozen berries is affected by addition of newer pectins; (2) methods and technology for incorporation of more effective firming agents; (3) other substances that may be used singly, or in combination with pectin and sugars, to increase drained weight of thawed berries; (4) chemical composition and stage of maturation as they affect drained weight of pectin-treated berries; (5) optimum levels of various substances - pectins, etc., to use in freezing preservation of Tennessee-grown strawberries; and (6) consumer opinions of colloid-treated strawberries preserved by freezing.

Chem. 85

#### F. Potatoes and Potato Products

Alaska Technological Improvements to Increase the Quality and Consumption of Alaskan Potatoes. To determine (1) why Alaska consumers prefer state-side grown potatoes when attractive packs of Alaska grown potatoes are for sale at same counters; and evaluate economic implications of commercial adaptation of technological changes by growers and handlers; (2) by chemical analysis and organoleptic tests if Alaskan potatoes differ from stateside potatoes offered in Alaska; (3) if Alaskan potatoes are as acceptable to Alaskans as stateside ones when they are grown under varied soil and fertilizer conditions, stored and handled in a manner comparable to stateside ones.

Hort., Econ. ES-476

- Mo.            Technology of Irish Potato Products. To (1) determine relative storing qualities of Irish potato varieties and effect of several treatments on these varieties; and (2) study factors affecting texture and color of mashed potatoes during preparation, freezing, and frozen storage.  
Hort. 234
- N. J.           Fertilizing, Varietal and Cultural Factors Influencing the Cooking, Chipping and Freezing Quality of Potatoes. To determine effect of following factors on potato chips, French fries, and table quality: sulfate of potash vs. muriate of potash; various fertilizer formula and rates; varieties; cultural factors as: planting depth, planting and harvesting dates, use of irrigation, applications of fungicides and insecticides, methods and time of vine killing, sprout inhibitors, storage conditions.  
Plant Path. 483
- N. Y.           Research to Improve the Technology of Handling Potatoes (Cornell) after Harvest and the Evaluation of New Practices by Consumer Panels and Objective Measurements. To develop new ways of handling and processing potatoes and new methods of quality control.  
Veg. Crops 197 (NEM-20) (See also Part 22, Section b)
- Ohio           Effects of Varieties, Cultural Practices, Storage, Pest Control, and Processing Techniques on the Chipping Quality of Potatoes.--1. Influence of Variety, Fertilizers, and Date of Planting on Quality of Potatoes Manufactured Into Potato Chips. To determine (1) changes in cultural practices needed to take full advantage of longer growing period and larger yields resulting from use of new varieties, improved pesticides and fertilizers with higher proportion of N; and (2) effect of cultural practices on quality of the crop, particularly on value of potato chips.  
Hort. 122-1

Derived Products (by manufacture)

- Colo.           The Baking of Flour Mixtures at High Altitudes. To study (1) how constituents of flour mixtures behave under influence of pressure, humidity, and temperature variables; (2) fundamental principles involved in behavior; (3) effect of changes in kinds and amounts of constituents upon texture and acceptability of products; (4) suitable methods of mixing; (5) formulas for ready mixes; and (6) tests of resulting products by histological, chemical and physical means.  
Home Econ. 60

- Ill.            Correlation of the Chemical and Physical Properties of Starches with Their Behavior in Food Products. To determine (1) how fat, protein, sweetening agents, salts and acids affect the behavior of food starches, modified starches, and flours under food preparation conditions; (2) applicability of the basic data to the selection of starches for specific food products.  
Home Econ. 60-322
- Iowa           The Quality of Products Prepared from Cereal Grain. 1. Factors Associated with Consistency of Starch Products. To increase acceptability of products containing grain or grain-fractions by elucidation of factors affecting the quality of those prepared foods.  
Home Econ. 1366
- Kans.          Factors which Influence the Colloidal Properties of Dough. (1) To clarify the colloidal behavior of wheat flour doughs; and (2) to determine the influence of (a) the constitution of the gluten protein, and (b) the factors in the gluten environment which modify its properties.  
Milling Indus., Physiol. 200 Coop. ARS
- Kans.          Increasing Flour Consumption Through Improved Flavor in Bread. To (1) develop baking methods which will improve flavor in bread; (2) use chromatographic techniques to isolate, identify, and measure the organic constituents responsible for bread flavor; (3) conduct consumer tests to determine most suitable concentrations of organic constituents; (4) try to produce desirable flavor constituents in a preferment by use of selected microorganisms; (5) investigate possibility of dehydrating desired flavor constituent to be used in preferment.  
Flour and Feed Milling Indus., Bact. ES-458
- Mo.            Testing the Flours from Regular Varieties and from Experimental Strains of Wheat for Their Adaptiveness to Different Culinary Purposes. To evaluate and compare baking qualities of flours milled from new varieties and experimental selections of wheat with known varieties, testing 18-20 flour samples.  
Home Econ. 205 (NC-30) (See also Part 8, Section a)
- N. Y.          Maple Products Production. To (1) determine costs of production of various aspects of sirup operation, as relative influence of sap flow per bucket and sugar percentage; (2) study how small an operation can be conducted profitably; (3) study sirup quality as influenced by sugar sand, sap sweetness, bacteria, and progress of season; (4) analyze cost of early tapping, reaming, deep tapping, and hanging different numbers of buckets on tree; (5) determine effect of crown on sap production and sugar concentration, and what type of tree is most desirable and what to aim at in developing a sugar bush; (6) determine how best to thin sugar bush.  
Conservation 84

- N. Y. The Absorption of Iron from the Iron Preparations Currently  
(Cornell)Used in the Enrichment of Flour and Bread. To find the amount  
of iron absorbed from each of the three iron preparations now  
used for enriching flour and bread with the purpose of improving  
the iron enrichment program.  
Food and Nutr. 106
- N. Y. The Properties of the Constituents of Wheat Flour and their  
(Cornell)Role in Food Preparation. To study physical and chemical proper-  
ties of three major constituents of wheat flour, their interrela-  
tionships, and the effect of addition of other ingredients in  
order to understand better the role of constituents in food products.  
Plant Breeding, Food and Nutr. 109
- N. Y. Factors Affecting Quality of Cherry Pie Fillings. To study  
(Cornell)(1) the interrelationships of variations in quality and type of  
pack of canned and frozen cherries, and the method of preparation  
of pie fillings, including variation in type of thickener, in  
manner of combining ingredients, and in rate of heating; (2) role  
and influence of different variables on flavor, consistency and  
color of pie fillings.  
Food and Nutr. 211
- N. Dak. Wheat Protein Fractions and Baking Quality. To determine  
cause of differences in baking quality between protein fractions  
from different hard red spring and durum wheats and to ascertain  
effect of proteolytic enzymes upon properties and relative distri-  
bution of these protein fractions.  
Cereal Tech. 10-1
- N. Dak. An Investigation of the Susceptibility of Starches to  
Attack by Alpha-Amylase. To develop a reliable method for estimat-  
ing alpha-amylase activity of ungerminated cereals, especially  
barley, through study of effect of starch gelatinization tempera-  
ture and retrogradation upon alpha-amylase activity, and salts  
and proteinase activators influence on alpha-amylase of ungerminated  
barley.  
Cereal Tech. 10-3
- Oreg. Precooking and Freezing of Foods Containing Oregon Fruits.  
To (1) determine adaptability of Oregon fruits to freezing in  
raw and precooked foods with special reference to flavor, texture,  
and appearance changes in products during storage; and (2) develop  
control procedures to reduce or overcome problems of shrinkage  
of fruit, excessive juiciness of the product, flavor and texture  
losses as commonly shown by precooked frozen products now available.  
Food and Dairy Tech. 147

- Oreg.        The Physical Structure of Batters and Doughs as Affected by Freezing Storage. To (1) develop methods for studying structural relation of batter and dough constituents; (2) determine physical structure as related to quality of baked products; (3) determine changes in their normal structure in freezing process or during frozen storage and effect of these changes on product quality; (4) explore methods of stabilizing normal structure with the object of extending storage life and improving quality of products baked from frozen batters and doughs.  
Home Econ. 389
- Pa.        The Preparation of Honey for Market. To determine (1) efficiency of existing equipment for processing honey and if necessary to develop new equipment; (2) effect of various processing temperatures on nutritive quality of honey; and (3) develop new honey products for consumer markets.  
Zool. and Ent. 1133
- Pa.        Physical and Chemical Properties of Soft Wheat Flour and Its Component Fractions as Affected by Sugars. To determine (1) influence of sugars on physical characteristics of an unfractionated soft wheat flour; (2) influence of sugars on physical and chemical characteristics of crude gluten, prime starch, tailings, and soluble fractions of soft wheat flour in simple systems; (3) function of fractions of soft wheat flour and influence of sugars in a typical baked product.  
Food and Nutr. 1319
- P. R.      Direct-Consumption-Sugar Production by Ion Exchange. To determine (1) effectiveness of ion-exchange procedures in purifying clarified juice from Puerto Rican sugarcane and evaluate procedures technically and economically; and (2) existing operating data on usefulness of ion-exchange treatment on clarified juices.  
Food Tech. 99
- S. C.      Investigations on the Development of Complete Cornmeal Mixes. To (1) develop cornmeal mixes having good nutritional acceptability, and stability properties; (2) design formulations for cornbread, corn-muffins, and cornstick mixes containing egg solids, non-fat milk solids, soy flour, and shortenings; determine water needed for batter; (3) test for product acceptability; (4) calculate nutritional values and relative costs; (5) subject mixes having desirable characteristics to storage at selected temperatures.  
Food Products, Human Nutr. 435
- W. Va.     The Improvement of Apple Juice. To (1) fortify and improve apple juice by adding one or more natural constituents of apples; (2) evaluate several bitter-sweet and bitter-sour crab apple varieties for improvement of flavor, body and nutritional value; (3) determine tannin, total soluble solids, titrable acidity and Vitamin C content of juice of crab apple varieties; and (4) establish chemical identity of flavor constituents having desirable flavor characteristics.  
Hort., Agr. Biochem. 21

Formulated Products

- Nebr. The Effect of Source and Proportion of Ingredients Upon Quality of Frozen Desserts. To (1) develop and/or modify formulae for ice cream, sherbet, and a low calorie frozen product with reference to solids-not-fat, sweetening agents, stabilizers, and flavoring; and (2) determine flavor and texture qualities of products most acceptable to consumer.  
Dairy Husb. 507
- Ohio Manufacture and Quality Evaluation of Strained (Pureed) Foods. To (1) develop new methods of manufacture of strained horticultural foods; frozen strained foods, dried powdered foods; (2) evaluate these foods as to their; nutritive values, microflora, acceptance by geriatric and other potential consumers; (3) compare these foods to conventionally manufactured strained foods for nutritive retention, quality differences, acceptance by geriatric and other potential consumers.  
Hort. 154
- Oreg. Formulation of New Commercial Food Products. To (1) develop formulas and procedures for using agricultural products in prepared or convenience foods, suitable for sale through various marketing channels; (2) determine acceptability of these foods (3) determine stability of foods; and (4) estimate costs of production of these foods.  
Food and Dairy Tech. 352

FOOD UTILIZATION AND WASTE DISPOSAL

- Hawaii Studies to Determine the Nutritive Value and Metabolism of Products and By-Products of Hawaiian Industry. To (1) seek information relative to value of products and by-products of Hawaiian agriculture and industry for livestock feeding with major emphasis on use of molasses, sugar cane, bagasse, and pineapple by-products by chemical analysis of feeds to be used; (2) determine digestibility; (3) conduct feeding trials; (4) assess production response accompanied by: studies of nutrient absorption, nutrient and metabolite levels in blood and urine, metabolism and its relation to requirements for specific nutrients.  
Anim. Sci. 269
- Hawaii Assay of Native and Introduced Tropical Plants for Products of Economic Value. To (1) gather information regarding content of plant products of economic value in certain tropical plants; (2) evaluate quality of product, if present in relatively high concentrations; (3) study possible methods for commercial processing of products.  
Agr. Biochem. 620

- Mo.            Studies on the Utilization of Processed Food and Food Improvement. To (1) study developing and standardizing family size recipes using nonfat dry milk solids for high nutritive value; (2) study better methods of applying meat tenderizers to piece meats; (3) continue study on development, standardization, and shelf life of a quick mix using nonfat dry milk solids and dried egg solids; (4) study use and best way of incorporating dried eggs in food products; (5) study freezer storage of baked goods using state products as apples, soft wheat, lard, etc.; (6) test methods of use of new products, which would contribute to value of diet.  
Home Econ. 130
- N. Dak.        Chemical Modification of Flaxseed Mucilage. To (1) prepare chemical modifications of flaxseed mucilage; (2) study physical and chemical properties of chemical modifications; (3) determine if modified mucilages will be commercially useful for gelling agents, emulsifiers, adhesives, or wetting agents.  
Agr. Chem. 2-4
- Pa.            Development of Nitrogenous Derivatives of Cheese Whey Solids. To (1) develop practical methods for recovering lactose and other whey solids from cheese through precipitation with nitrogen- Co containing compounds; and (2) evaluate these products for animal feed purposes.  
Dairy Sci. 1237
- P. R.          Microbiological Studies on the Utilization of Molasses. To (1) search for new strains of microorganisms that better satisfy needs of alcoholic, lactic, citric, and acetic fermentations; (2) produce new strains of yeasts to more efficiently carry out the alcoholic fermentation; (3) determine optimum conditions under which microorganisms used for above-mentioned fermentations would carry out desired transformations; (4) establish correlations between physiological activities of yeast cells and their microscopic appearance.  
Rum Pilot Plant 57



REGIONAL PROJECT

NCM-7 Maintaining Quality of Poultry Products in Market Channels.

To (1) study the basic causes of deterioration in quality of eggs and poultry meat during the marketing process; (2) develop methods that are commercially feasible for maintaining or improving the initial quality of poultry products while in channels of trade; and (3) develop laboratory and commercial methods for accurately measuring and/or predicting quality and quality losses in eggs and poultry meat in market channels.

Cooperating stations: This section, Iowa, Kans., and Mo. Section c: Ind., Mich., Minn., Nebr., Ohio, and S. Dak.



LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS  
AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8: Part : Numbers :	Subject-Matter Area	Title of Section
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	<ul style="list-style-type: none"> <li>a. Prices, Incomes, &amp; General Studies of Commodities &amp; Industries</li> <li>b. Farm Management</li> <li>c. Land Economics</li> <li>d. Farm Finance &amp; Taxation</li> </ul>
3	Agricultural Engineering	<ul style="list-style-type: none"> <li>a. Land &amp; Water Use &amp; Development</li> <li>b. Power Machinery &amp; Equipment</li> <li>c. Farm Structures &amp; Materials</li> </ul>
4	Animal Husbandry	<ul style="list-style-type: none"> <li>a. Beef Cattle</li> <li>b. Sheep &amp; Goats</li> <li>c. Swine</li> </ul>
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	<ul style="list-style-type: none"> <li>a. Field Crop Insects</li> <li>b. Fruit, Nut &amp; Vegetable Insects</li> <li>c. Miscellaneous Insects &amp; Economic Zoology</li> <li>d. Insecticides</li> </ul>
8	Field Crops	<ul style="list-style-type: none"> <li>a. Cereal Crops</li> <li>b. Oil, Fiber, Tobacco &amp; Sugar Crops</li> </ul>
9	Food Science & Technology	<ul style="list-style-type: none"> <li>a. Food Chemistry, Microbiology, Sanitation &amp; Public Health</li> <li>b. Food Engineering, Processing, Product and Process Development, Utilization and Waste Disposal</li> <li>c. Food Quality &amp; Standards, Acceptance, Preference, &amp; Marketing</li> </ul>
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8:		
Part :	Subject-Matter Area	Title of Section
Numbers :		
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	<ul style="list-style-type: none"> <li>a. Human Nutrition</li> <li>b. Housing</li> <li>c. Clothing &amp; Textiles</li> <li>d. Foods-Consumer Quality &amp; Utilization</li> <li>e. Household Economics &amp; Management</li> </ul>
14	Economics of Marketing	<ul style="list-style-type: none"> <li>a. Field Crops</li> <li>b. Fruits &amp; Vegetables</li> <li>c. Livestock, Meats &amp; Wool</li> <li>d. Dairy Products</li> <li>e. Poultry &amp; Poultry Products</li> <li>f. Forest Products &amp; Ornamental &amp; Drug Plants</li> <li>g. Cross-Commodity &amp; Functional Studies</li> </ul>
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	<ul style="list-style-type: none"> <li>a. Plant Pathology, Botany, &amp; Diseases of Miscellaneous Crops</li> <li>b. Diseases of Field Crops</li> <li>c. Diseases of Fruit Crops</li> <li>d. Diseases of Vegetable Crops</li> </ul>
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	<ul style="list-style-type: none"> <li>a. Soil Chemistry &amp; Microbiology</li> <li>b. Soil Fertility, Management &amp; Soil-Plant Relationships</li> <li>c. Soil Physical Properties, Conservation &amp; Classification</li> </ul>
22	Vegetables	<ul style="list-style-type: none"> <li>a. Vegetable Crops</li> <li>b. Potatoes</li> </ul>
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control



